REMARKS

Regarding the Claim Amendments presented in this reply:

The amendments to the claims add no new matter. The amendment to claim 1 finds support in the specification on page 3, lines 14 – 16. Entry and consideration of this amendment would not require further search, because a similar limitation was presented in original claim 3.

Regarding the Claim Rejections, in general:

The Examiner has rejected:

I. claims 1 – 13 and 18 – 22 under 35 U.S.C. §102(b) over *Gravley et al.* (US 4,765,964);

II. claim 23 under 35 U.S.C §103(a) over *Gravley et al.* or over *Gravley et al.* in view of *Kuehner* (US 5,188,806);

III. claims 14 – 18 and 24 under 35 U.S.C §103(a) over *Gravley et al.* in view of *Bakker* (US 3,640,739); and

IV. claims 3, 13 – 19 and 24 on the grounds of nonstatutory obviousness-type double patenting over claims 1 – 7 of US 6,869,279.

Regarding Rejection I:

The Examiner should withdraw the rejection of claims 1 – 13 and 18 – 22 under 35 U.S.C. §102(b) over *Gravley et al.* (US 4,765,964).

The Office action alleges that no special definition has been provided for the term, "channel," or for the term, "gap." Thus, Applicants will begin by discussing these two terms, and will then discuss the invention as a whole. To begin, Applicants respectfully point out that "[t]he specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication."[1]

The term "gap," is defined by implication in the present specification. The

[1] *Vitronics Corp. v. Conceptronic, Inc.* 90 F.3d 1576, 1582, C.A.Fed. (N.H.), 1996, citing *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979, 34 USPQ2d 1321, 1330 (Fed.Cir.1995) (in banc) (emphasis added).

specification draws an important distinction between a cylindrical geometry and a gap-like geometry, stating:

> Preferably, the transition from the reaction chamber to the quench area is restricted to a gap having a width in the range from 50 to 150 mm. Using the solution according to the invention presented here, the disadvantages of the enlargement of the cylindrical cross section with respect to the realizable quench action are avoided by changing from the cylindrical geometry to a gap-like geometry. The gap is designed here such that heat dissipation is possible very effectively and homogeneously by direct spraying in of water from one or from both sides of the gap with small jet reaches and very fine sprays. Preferably, this gap is designed as an annular gap, thus preceding and afterconnected plant parts, which as a rule have a cylindrical cross section, can be integrated more easily.[2]

An annular gap is illustrated in Figures 2 and 4.

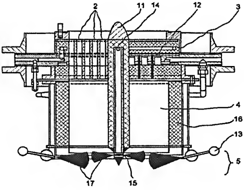
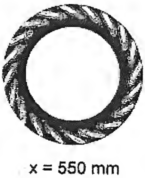


Figure 2.



Portion of Figure 4.

Figure 2, reproduced above, illustrates a section of a reactor, consisting of a burner block **3**, a reaction chamber **4** and a quench area **5**. Please notice the internal quench nozzles **15**, which are supplied via line **14**, and the spray jets **17**, which are directed into the annular gap. The portion of Figure 4, reproduced above, shows a quench medium sprayed clockwise in a tangential direction into the quench area designed as an annular gap using annularly arranged quench nozzles.

The specification makes clear that "[t]he gap-like, preferably annular gap-like geometry of the transition from the reaction chamber to the quench chamber makes

[2] Specification, page 3, lines 4 – 16.

possible jetting in of the quench medium, for example water or oil, either from one side of the gap or from both sides of the gap."[3] Applicants respectfully assert that in a merely cylindrical geometry, such jetting in of the quench medium is impossible, because only one "side" exists. Thus, the terms "gap," and "annular gap," as defined by implication in the specification, require more than a mere cylindrical geometry.

If the Examiner enters the amendment presented in this paper, claim 1 would explicitly require the gap to be annular. Applicants respectfully request that the Examiner enter and consider the amendment. Claim 3 already requires that the transition of the reaction chamber to the quench area is designed in the form of an annular gap. Claim 2 depends from claim 1. Claims 4 – 13 and 20 – 22 depend from claim 3.

The Office action alleges that the *Gravley et al.* reference discloses an annular gap. To support this assertion, the Office action cites column 6, lines 31 – 34, which states, "[t]he first generally cylindrical zone **50** preferably has a length in the range of from about 0.1 to about 15 times the diameter of the throat **34**, usually from about 0.5 to about 10 diameters."[4] Applicants respectfully assert that this portion of the reference does not disclose an annular gap, but a throat, which has a mere cylindrical geometry. Similarly, the preferred embodiment described in Example 1 of the *Gravley et al.* reference, indicates "B" as being the diameter of the throat **34**. Accordingly, the throat must be circular.

Despite the allegations presented in the Office action, the *Gravley et al.* reference does not describe a transition in the form of an annular gap from a reaction chamber to a quench area. Instead of an *annular gap*, the reference describes a mere *throat*. More specifically, the reference explains that:

> The mixing zone **6** comprises a sidewall **31** formed from refractory defining a chamber **32** in axial alignment with and converging from the combustion chamber **10** to a throat **34** and a means **36** for introducing a carbonaceous feedstock through the sidewall **31** and into at least one of the converging chamber **32** and the throat **34**.

Applicants also respectfully point out that the term "annular" is used in the

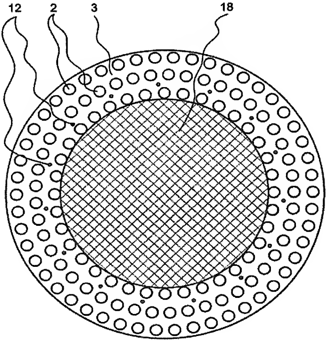
[3] Specification, page 3, lines 29 – 32 (emphasis added).
[4] Column 6, lines 31 – 34 of US 4,765,964.

Gravley et al. reference. However, the term is used simply to refer to the shoulder **54** separating the zones **50** and **52,** because the design provides a good flow pattern (*See* column 6, lines 35 – 36).

Via channels of a burner block

Among other requirements, the reactor scaled-up by the process of claim 1 must provide a supply of a reaction mixture via channels of a burner block to a reaction chamber, not merely through a single channel.

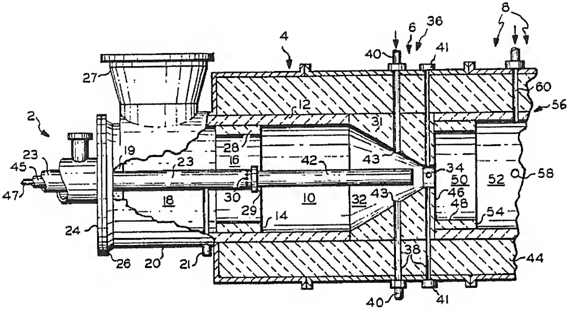
Figure 3, reproduced below, shows a top view of a burner block according to the present invention. The channels **2** of the burner block **3** supply a reaction mixture to the reaction chamber.



The Office action asserts that the term "channel" is synonymous with the term "passage." Even if this assertion is assumed, for the sake of argument, to be accurate, supplying a reaction mixture via a single passage to a reaction chamber would not meet the claim limitations. Again, the reactor scaled-up by the process of claim 1 must provide a supply of a reaction mixture via <u>channels</u> of a burner block to a reaction

chamber, not merely through a single channel.

According to the *Gravley et al.* reference, "a tubular member **23** extends through the chamber **18** and empties into the passage **16**."[5] "Oxidant fluid and combustible fluid are introduced into a chamber **10** via the passage **16**."[6]



Thus, the *Gravley et al.* reactor does not provide a supply of a reaction mixture <u>via channels of a burner block</u> to a reaction chamber. To the contrary, the *Gravley et al.* reference describes supplying a reaction mixture to a reaction chamber via a passage **16**.

Consideration of the Claimed Invention as a Whole

The *Gravley et al.* reference differs from the subject matter of the present invention. The inventors have found that the specific reactor geometry defined in claim 1, and discussed above, makes it possible to scale up the reactor without losses in yield. As explained in the specification, enlargement of a reactor having a geometry like the geometry described in the *Gravley et al.* reference is "problematical, since with increasing diameter of the cylindrical reaction chamber and of the cylindrical quench area

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[5] Column 3, lines 22 – 24 of US 4,765,964.
[6] Column 3, lines 15 – 16 of US 4,765,964.

the homogeneity of the quench action is more and more difficult to guarantee."[7] The specification goes on to explain that

> the penetration depth of the spray jets and the droplet size in the atomization are directly connected. This means that the small droplets necessary for rapid evaporation and thus a good quench action only achieve limited penetration depths, since the small droplets are prematurely deflected on account of the low impetus. Inhomogeneities in the quench action thereby occur, which favor the breakdown of the acetylene in the hotter streams.

It was the object of the invention to find a burner geometry which on scale enlargement causes no yield losses. The present specification explains that a reactor having the specific reactor geometry defined in claim 1 can be scaled-up without losses in yield. More specifically, the disadvantages of the enlargement of the cylindrical cross section with respect to the realizable quench action are avoided by changing from the cylindrical geometry (like the throat **34** described in the *Gravley et al.* reference) to a gap-like geometry. The gap is designed such that heat dissipation is possible very effectively and homogeneously by direct spraying in of water from one or from both sides of the gap with small jet reaches and very fine sprays.

The *Gravley et al.* reference does not disclose the specific reactor geometry as defined in the claims. Thus, the reference does not anticipate the present invention.

Additionally, the *Gravley et al.* reference does not provide any hint that the specific reactor geometry required by the present invention would be specially suited for scale-up without losses in yield. No apparent reason existed to modify the *Gravley et al.* reference so that the reactor provides a supply of a reaction mixture via channels of a burner block to a reaction chamber. No apparent reason existed to modify the *Gravley et al.* reference so that the transition from the reaction chamber to the quench area is designed in the form of an annular gap, let alone an annular gap which is restricted to a width in the range from 2 to 200 mm. Thus, the present invention is non-obvious over the *Gravley et al.* reference.

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[7] Specification page 2, lines 12 – 14.

Regarding Rejection II:

The Examiner should withdraw the rejection of claim 23 under 35 U.S.C §103(a) over *Gravley et al.* (US 4,765,964) or over *Gravley et al.* in view of *Kuehner* (US 5,188,806).

The *Kuehner* reference does not provide an apparent reason to modify the *Gravley et al.* reference so that the reactor provides a supply of a reaction mixture via channels of a burner block to a reaction chamber. The *Kuehner* reference does not provide an apparent reason to modify the *Gravley et al.* reference so that the transition from the reaction chamber to the quench area is designed in the form of a gap, let alone an annular gap. Thus, the present invention is non-obvious over *Gravley et al.* in view of *Kuehner.*

Regarding Rejection III:

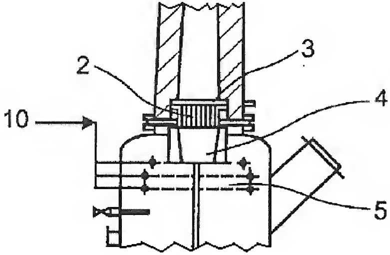
The Examiner should withdraw the rejection of claims 14 – 18 and 24 under 35 U.S.C §103(a) over *Gravley et al.* in view of *Bakker* (US 3,640,739).

The *Bakker* reference does not provide an apparent reason to modify the *Gravley et al.* reference so that the reactor provides a supply of a reaction mixture via channels of a burner block to a reaction chamber. The *Bakker* reference does not provide an apparent reason to modify the *Gravley et al.* reference so that the transition from the reaction chamber to the quench area is designed in the form of a gap, let alone an annular gap. Thus, the present invention is non-obvious over *Gravley et al.* in view of *Bakker.*

Regarding Rejection IV:

The Examiner should withdraw the rejection of claims 3, 13 – 19 and 24 on the grounds of nonstatutory obviousness-type double patenting over claims 1 – 7 of US 6,869,279. First, applicants respectfully note that claim 19 was cancelled in reply to the previous Office action.

The Office action asserts that an annular gap is "necessarily present in the reactor of the '279 patent, since there must be some separation of space (i.e. a 'gap') between the reaction zone and quench zone."[8] To the contrary, an annular gap is not described in US 6,869,279. Figure 2 of US 6,869,279, partially reproduced below, illustrates the transition between the reaction chamber **4** and the quench area **5** according to the reference. This transition is not in the form of an annular gap. Instead, reaction chamber **4** empties into quench area **5** through a mere cylindrical cross-section.



Thus, the US 6,869,279 reference describes precisely the sort of cylindrical geometry that is distinguished from a gap-like geometry in the specification on page 3, lines 7 – 16. Moreover, scale-up of the reactor described in the US 6,869,279 reference would be subject to the problems described in the specification on page 2, lines 12 – 24.

The US 6,869,279 reference provides no apparent reason to make the modifications necessary to arrive at the present invention. Thus, claims 3, 13 – 19, and 24 are non-obvious over claims 1 – 7 of the reference.

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[8] Page 9, lines 19 – 20 of the Office action mailed December 28, 2007, and Page 10, lines 15 – 16 of the Office action mailed January 09, 2007.

In Conclusion:

The present application is in condition for allowance. Applicants request favorable action in this matter. In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner is welcome to contact the undersigned by phone to further the discussion.

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